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COST OF PRODUCING HOGS IN IOWA AND ILLINOIS, YEARS 1921-1922[1]

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GENERAL ECONOMIC CONDITIONS

Violent fluctuations in the prices of corn and hogs following the World War brought consideration of the problem of farm costs and profits to every Corn Belt farmer as never before. This study of costs and methods of hog production was made to determine the factors influencing the cost of producing pork in the Corn Belt.

The influence of the World War upon economic conditions was felt in this country before the entrance of the United States into the war. By 1917 the price of all commodities had advanced about 80 per cent above the pre-war price level. The prices of corn and hogs equalled the advance in the all-commodity price level during 1916; but in 1917 corn prices nearly trebled, and hog prices doubled their pre-war levels. The immature corn crop, coupled with the wartime demand for pork and its products, caused a precipitate rise in the price of corn and hogs above the general level of prices during 1917. Corn prices outstripped hog prices, however, and remained above them generally for the entire period of inflation as the ratio of corn price to hog price reached its peak of 13.6 in 1917 and declined to 10.7 in 1918, 11.0 in 1919, and 8.7 in 1920.

The deflation period was characterized by two major movements in hog prices. The first movement occurred in the summer of 1919,

[1] This study covers the cost of pigs from the date sows were sorted out to be bred until the pigs produced by them were disposed of. Pigs born in 1921 are called "the 1921 pigs," although all of the fall pigs and possibly some of the spring pigs born that year were fattened and sold in 1922. In like manner "the 1922 pigs," born in 1922, were not entirely disposed of until well into the summer of 1923. This study therefore covers the period from the time sows were selected for breeding in the fall of 1920 well into the summer of 1923.

[2] Credit is due G. S. Klemmedson, of this bureau, for constructive work in helping to organize this study and in gathering the field material during the first year.

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when the index of hog prices dropped from 274 in July to 171 in December. The price of corn, beginning a downward movement in 1917, recovered somewhat with the hog prices of 1919 and with the increase in general business conditions in 1920. The second downward movement in hog prices began in the fall of 1920 and completed the deflation process. Corn prices and the general index of all-commodity prices continued to drop rapidly after May, 1920, whereas the hog prices strengthened somewhat in October of that year after which they also declined rapidly.

Economic conditions assumed some stability in the summer of 1921. The general price level fortified itself about 44 points above the 1910–1914 average. Corn and hog prices sank much below the general price level. Hogs averaged generally 10 to 20 points above the pre-war average, whereas corn dropped to 72 in October, 1921, or 28 points below the pre-war average. Hogs now held a more favorable position than corn as the ratio of corn price to hog price increased

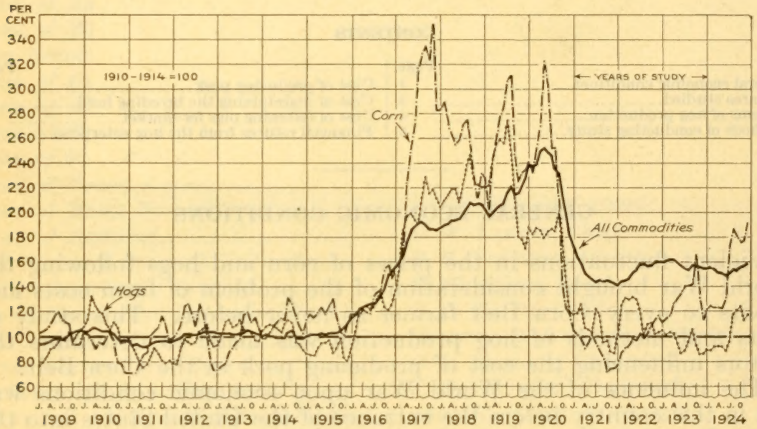

FIG. 1.—The graph shows the general trend of the prices of corn and hogs, and of all commodities since the year 1908. The prices of hogs have a very marked tendency (excepting during the war) to fluctuate in regular cycles, being low two years and high two years in relationship to the prices of all commodities

from 8.7 in 1920 to 13.7 in 1921 and to 16.8 in 1922. Corn prices were rising, and after September, 1922, hogs were in a less favorable position compared with corn. Many of the pigs born during the second year of this study were marketed during 1923. During this year the price of corn fluctuated violently, reaching the highest point since 1920. The close of 1923 found the index of hog prices 14 points below pre-war, corn prices 13 points above, and the general price level of all commodities fluctuating 50 to 60 points above the pre-war relationships.

The price relationships are shown graphically in Figure 1. The years of this cost-of-production study are those after the deflation period. During the first year of study the all-commodity index was about 44 points above pre-war conditions and the corn-hog ratio was favorable to hogs. During the second year of study the general price level had risen more than 10 points and the corn-hog ratio was favorable to corn.

THE AREA STUDIED

The black portions of the outline map (fig. 2) indicate the location of the area studied. Henry County, Iowa, and Warren County, Ill., are both large producers of corn, hogs, and cattle. These counties are about 60 miles apart and are much alike in types of farming. The main line of the Chicago, Burlington & Quincy Railroad serves both counties. The main line of the Santa Fe also serves Warren County. The principal markets are Chicago and East St. Louis, Ill. Some hogs from Henry County are shipped to the local markets at Burlington, Ottumwa, and Wapello. A large part of Henry County, Iowa, is level, with a deep fertile soil. Corn yields of 80 bushels per acre are sometimes obtained in the best years. Large quantities of surplus

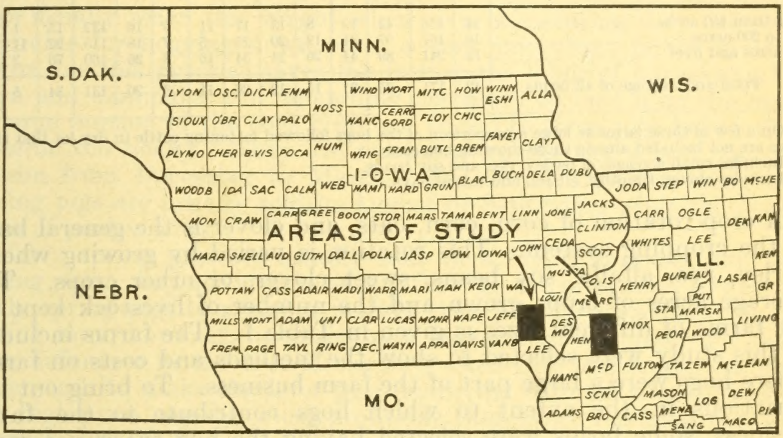

FIG. 2.—This study was carried on in Henry County, Iowa, and Warren County, Ill. Conditions surrounding hog production in this section is typical of Corn Belt conditions

corn are sold in this area. Warren County, Ill., is not quite so regular in its topography as Henry County, Iowa. Both counties are very productive, with a system of general farming.

Many combinations of crops and livestock are used. Receipts from crops were 23 per cent of the total farm receipts in 1921 and 27 per cent in 1922. Livestock receipts were 70 per cent of the total farm receipts in 1921 and 64 per cent in 1922. Miscellaneous income and the increase in feed inventory made up the remaining 7 per cent in 1921 and 9 per cent in 1922. Livestock of all kinds may be found in the area. Some dairy and beef herds are maintained and many feeder cattle are shipped in for the feed lots. A few sheep are raised and some feeder lambs are bought. Hogs are raised on specialized hog farms, in combination with cattle feeding, and on farms of a more general organization. Feeder hogs are sometimes purchased.

TABLE 1.—*Crops and livestock raised on farms of various sizes*

[Farms in Warren County, Ill., and Henry County, Iowa, covered in this study]

Size of farms in acres	Number of farms [1]	Average acres per farm	Corn	Oats	Wheat and other grains [2]	Hay [3]	Pasture		Waste	Livestock (number)				
							Bluegrass	Rotation		Sows	Pigs	Cattle	Sheep	Horses
1921														
Less than 150 acres	20	110	47	16	3	13	14	12	5	15	90	12	2	6
150 to 200 acres	19	165	67	31	5	22	16	17	7	16	95	15	6	9
200 acres and over	14	276	110	53	7	28	44	25	9	25	164	46	7	12
Total and average of all farms	53	174	71	31	5	20	22	17	7	18	111	22	5	9
1922														
Less than 150 acres	14	116	43	19	8	13	17	11	5	16	132	15	1	7
150 to 200 acres	16	167	67	31	12	20	25	5	7	18	115	22	11	9
200 acres and over	12	241	89	44	26	24	34	16	8	26	169	70	2	11
Total and average of all farms	42	171	65	31	15	19	24	11	6	20	131	34	5	9

[1] On a few of these farms so large a proportion of the hogs followed fattening cattle in dry lot that these farms are not included among those showing hog costs.
[2] Includes small acreages of barley, rye, and soy beans.
[3] Includes clover, timothy, alfalfa, and mixed hays.

A crop rotation of corn, corn, oats, and clover is the general basis of the cropping system. This rotation is varied by growing wheat, barley, rye, alfalfa, soy beans, sweet clover, or other crops. The average acres of crops grown and the number of livestock kept on the farms of different sizes is given in Table 1. The farms included in this study were selected to show the methods and costs on farms where hogs were a large part of the farm business. To bring out the variations in the extent to which hogs contribute to the farm business, some farms were selected having the hog enterprise more developed, and others less developed, than the average. The typical farm of this area would probably include a greater percentage of receipts from crops and cattle than is indicated in this study.

SYSTEMS OF HOG PRODUCTION

ONE LITTER PER YEAR

The one-litter system of hog production is carried on by raising early or late spring pigs. The early spring pigs are farrowed during February and March. Comfortable quarters and excellent care are necessary at farrowing time if a good pig crop is to be saved. The sows and litters are put on pasture about April 1, and the sows removed about June 1, to wean the pigs. The sows are usually fattened and sold after the pigs are weaned. The greater portion of the early spring pig crop is fed out for the fall market of September and October. The pigs are grown as rapidly as possible by using the best pasture available on the farm and supplementing a full feed of corn with various protein feeds. They are fattened on the corn crop of the previous year. At the time when this corn is fed to the hogs, it is usually higher in price than at any time since it was harvested.

If a corn shortage occurs on a farm, these early spring pigs may be fed a limited ration during the summer and finished on the new corn crop. In such cases they reach market in November and December.

The hog market at this time is usually lower than during September and most hog producers feel that they need the advantage of a high fall market to compensate them for the greater care required at farrowing time and the risk of heavy losses before weaning. The farmers who raise early spring pigs usually try to market the packer sows early before the heavy run of sows in late June and July.

The late spring pigs are farrowed during April, May, and June. The favorable weather at this time reduces the labor required to care for them and less expensive equipment is necessary. Many of these pigs are farrowed on pasture in movable types of houses and around straw stacks. These pigs are usually fed a growing ration during the summer instead of being full fed. A pig averaging about 125 pounds on September 15 is the aim of these hog producers, as such pigs are well adapted for hogging down corn. As late spring pigs usually reach this weight when corn is maturing they are more desirable for hogging down corn, a very important factor in their favor, for this practice saves the farmer the labor of harvesting the corn and eliminates the rehandling necessary to feed it to the hogs. A large portion of the corn crop can be fed to these pigs before they become too heavy. They are marketed during the winter packing season from December to March. The brood sows farrowing late spring pigs are usually sold in August or September after the heavy runs of packer sows.

Early spring pigs are usually sold on a higher market than late spring pigs. Any advantage arising through the possibility of getting early spring pigs to a higher market than pigs farrowed later in the spring may, however, be offset by a higher cost of these early pigs. The difference in the cost of the two when they reach market may be enough to make the later pigs, marketed through necessity after the high-price months, more profitable than those reaching the high market.

The number of pigs weaned per sow is a large factor influencing the cost of production. Larger litters from late spring farrowings should be possible, because of the more favorable weather. The amount of labor necessary at farrowing time, although this demand for labor may conflict with field work in the spring, should be less for late pigs than early pigs. The late spring pigs consume the corn crop soon after it is matured. The early spring pigs consume the old crop during the summer. Thus the corn crop is marketed about six to nine months earlier through late spring pigs than through early spring pigs. Shrinkage and other costs of holding grain and conditions of supply and demand make the average value of corn fed to early spring pigs higher than the value of corn fed to late spring pigs. Late pigs save labor by hogging down corn, whereas early pigs must be about ready for market by the time the corn is matured. The late pigs have a greater risk of loss from cholera and influenza than early pigs, since the late pigs are fed out during the winter months.

TWO LITTERS PER YEAR

If fall pigs are raised they are usually combined with early spring pigs. The spring pigs are weaned when about 8 weeks old and the sows bred to farrow in August and September. Some farmers succeed in breeding the sows for fall pigs before the spring pigs are

weaned. Fall pigs should be farrowed before October 1, if they are to winter in good condition. By feeding a good ration and providing warm, dry sleeping quarters, many farmers succeed in raising thrifty fall pigs. The fall pigs may be full fed and sold at light weight in April and May or they may be put on pasture about April 1 and sold during the summer. The weight to which the fall pigs are fattened is usually determined by the supply of corn on hand in the spring, the price of corn in its relationship to hog prices, and the number of spring pigs saved.

METHODS OF CONDUCTING STUDY

METHODS OF GATHERING DATA

The cost data in this study were gathered by the route method. Visits to each farm were made by a field man once every three weeks. The farmers cooperating in the work kept a daily record of changes in the rations fed to the hogs and the amount of time spent on the hogs, as well as complete farrowing, death, and sale records. The study was begun in the fall of 1920. The accounts were opened when the producer selected his breeding herd for the spring pigs of 1921. The feed and other items of cost were summarized monthly. Separate accounts were kept of the breeding herd and the spring and fall pigs after weaning time. The feed cost of the breeding herd includes the feed consumed by the boars, the sows, and their litters until weaning. The pigs are charged with all items of cost expended on them from the time of weaning until their death, sale, or selection for the breeding herd. Stocker pigs were sometimes sold, which accounts for the light-weight groups. In general, the accounting period is from the time of breeding until the offspring is sold.

MARKETABLE AND TOTAL PORK DEFINED

The loss of pigs after weaning is of considerable magnitude. These pigs represent what would have been marketable pork. The weight of the pigs sold, butchered for home use, and retained for the breeding herd, as well as the increase in weight of the breeding herd, is the marketable pork produced. The total weight of hogs produced is the sum of the marketable and unmarketable pork. The distinction is illustrated in the following summary of pounds produced:

	Pounds
Increase in weight of breeding herd	1,000
Weight of pigs sold	30,000
Weight of gilts selected for breeding herd	2,000
Weight of pigs butchered for home use	600
Weight of dead hogs	1,500
Total pork produced	35,100
Unmarketable pork (dead hogs)	1,500
Marketable pork	33,600

The distinction between marketable and total pork must be kept clearly in mind as the data are presented. In all tables when the cost of production is expressed in terms of value, the cost of 100 pounds is based on the amount of marketable pork. When the cost of production is expressed in physical quantities of feed and labor, the unit requirements are based on the total pork produced.

COST RECORDS LIMITED TO FARM

This is a study of the cost of producing hogs while on the farm. Items of expense incurred after the farmer has delivered the hogs to the local market or shipping point are not included in this report as cost. Labor required at the local shipping point is included in the labor charge. Cost of marketing (freight, commission, yardage, feed, inspection, insurance, and local shipping association fees) has been treated as a reduction from the sale price at market to get the net profit on the farm. By using weights at market and cost of production on the farm, shrinkage is distributed over the entire production, resulting in a higher cost per 100 pounds than if farm weights were used.

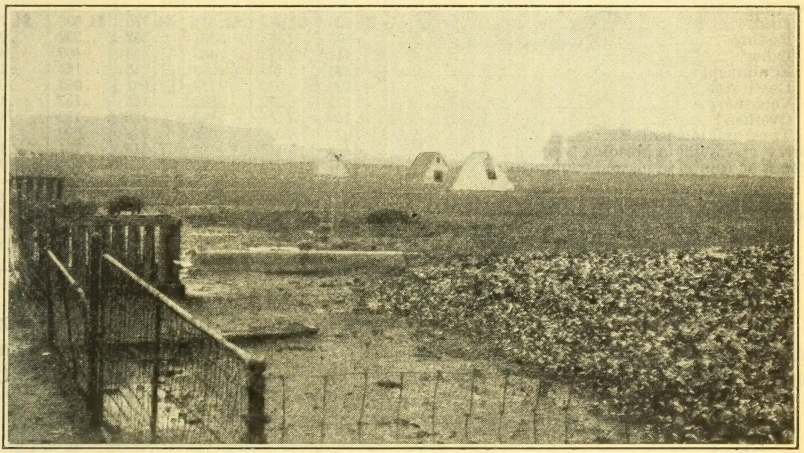

FIG. 3.—A saving in feed and labor was made on this farm by having fields of forage crops connected up with lanes from the central house and pens

COST OF PRODUCING PORK

In 1921, costs were obtained upon 44 farms producing 1,033,747 pounds of marketable pork, or an average of 23,494 pounds per farm. The gross cost of this amount of pork was $5.49 per 100 pounds and the net cost [3] was $5.42. The difference of 7 cents is appreciation in the value of the breeding herd. The increase in weight of the breeding herd has been included in the pork produced.

In 1922, costs were obtained upon 39 farms producing 1,004,003 pounds of marketable pork or an average of 25,744 pounds per farm. Twenty-eight of these farms were included in the 1921 work. The gross cost in 1922 was $6.32 or 83 cents higher than in 1921. This increase was largely due to a higher feed cost in 1922, because of the increase in the value of corn. The average farm price of corn in the 1921 costs was 36 cents per bushel and in 1922 it was 52 cents, in the area studied. The net cost of producing pork in 1922 was $5.86. A summary of the items which compose the average cost of 100 pounds of marketable pork for the years

[3] The net cost of pork was found by subtracting from the gross cost the balance of inventories, purchases, and sales of breeding animals. In determining this balance, animals were valued at the beginning of the year for breeding purposes and those during the year at market prices for slaughter. If market prices had been used in the inventories the deductions from the gross cost would have been greater.

1921 and 1922 is given in Table 2. The averages are given separately for those farms which raised one litter per year, those that raised two litters per year, and for these two classes combined.

TABLE 2.—*Average cost of producing 100 pounds marketable pork for years 1921–22, Warren County, Ill., and Henry County, Iowa*

Item of cost	1921			1922		
	1 litter	2 litters	Average	1 litter	2 litters	Average
Number of farms in group	28	16	[1] 44	15	24	[1] 39
Pork produced per farm (pounds)	21,150	27,596	23,494	21,974	28,100	25,744
Operating costs:						
Feed	$3.426	$3.632	$3.514	$4.776	$4.696	$4.722
Pasture	.395	.393	.394	.252	.259	.257
Labor	.444	.488	.463	.413	.469	.450
Equipment	.223	.190	.209	.218	.145	.169
Death risk	.150	.066	.114	.061	.053	.056
Veterinary	.271	.250	.262	.165	.157	.159
Overhead	.148	.151	.149	.176	.172	.174
Taxes and incidentals	.029	.027	.028	.018	.020	.019
Interest on capital in breeding herd	.115	.113	.114	.113	.101	.105
Interest on capital in lot and equipment	.257	.231	.246	.266	.175	.205
Gross cost per 100-pound gain	5.46	5.54	5.49	6.46	6.25	6.32
Appreciation in breeding herd	.06	.08	.07	.55	.41	.46
Net cost per 100-pound gain	5.40	5.46	5.42	5.91	5.84	5.86

[1] Total number of farms.

In 1921, the gross cost of producing 100 pounds of marketable pork varied between farms in this area from $3.07 to $13.55 with an average of $5.49. In 1922, the gross cost varied from $4.86 to $10.02

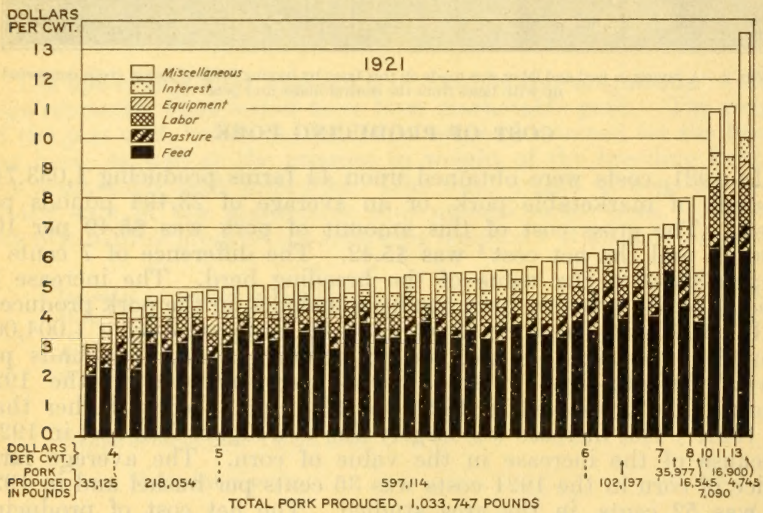

FIG. 4.—The wide variation from farm to farm in the costof producing pork indicates the influences of care and management in the hog lot. The variation in cost of producing 100 pounds of pork on these 44 farms in Iowa and Illinois was from $3.07 to $13.55. (See Table 3)

with an average of $6.32. Figures 4 and 5 present the variation in gross cost and also the variation of the items which compose the gross cost for 1921 and 1922 respectively.

In 1921, approximately 79 per cent of the pork was produced by 70 per cent of the farmers at a cost between $4 and $6 per 100 pounds. In 1922, a little more than 77 per cent of the pork was produced by 74 per cent of the farmers at a cost between $5 and $7 per 100 pounds. The higher cost for the group producing practically the same volume

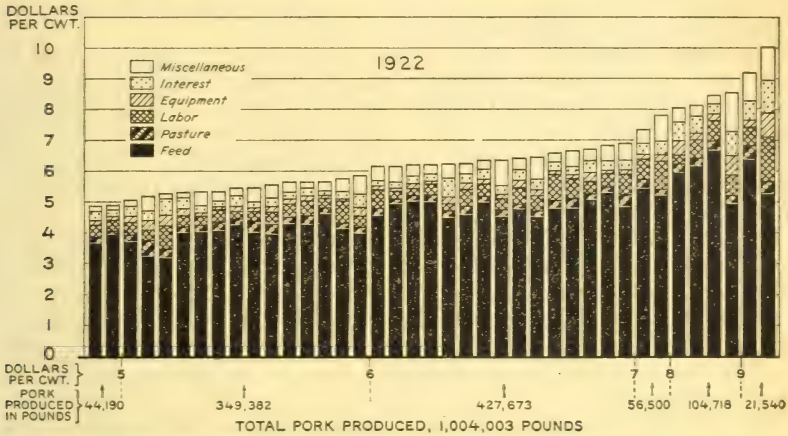

FIG. 5.—These farms were within a short distance of each other. Within this region it was possible to follow very similar methods, and yet some farms shipped hogs to market costing over twice what others did. The variation in cost of producing 100 pounds of pork on these 39 farms in Iowa and Illinois was from $4.86 to $10.02. (See fig. 4)

of pork in 1922 is due largely to the higher cost of feed during that year. The high cost of pork in the groups above this bulk is due to extremely unfavorable conditions surrounding production. The volume of pork produced in the various cost groups is given in Table 3.

TABLE 3.—*Quantities of marketable pork produced at various costs*

Cost group	1921			1922		
	Number of farms in group	Pounds produced	Per cent of total pork	Number of farms in group	Pounds produced	Per cent of total pork
$3 to $4	2	35,125	3.4			
$4 to $5	7	218,054	21.1	2	44,190	4.4
$5 to $6	24	597,114	57.8	14	349,382	34.8
$6 to $7	5	102,197	9.9	15	427,673	42.6
$7 to $8	2	35,977	3.5	2	56,500	5.6
$8 to $9	1	16,545	1.6	4	104,718	10.4
$9 to $10				1	14,705	1.5
$10 to $11	1	7,090	.7	1	6,835	.7
$11 to $12	1	16,900	1.6			
$12 to $13						
$13 to $14	1	4,745	.4			
Total	44	1,033,747	100.0	39	1,004,003	100.0

PHYSICAL UNITS REQUIRED TO PRODUCE 100 POUNDS OF PORK

Comparison of the one and two litter systems of pork production indicates that the addition of fall pigs increases the feed and labor requirements very slightly and decreases the other costs per 100 pounds. The greater cost of fattening fall pigs is offset by a cheaper

cost of pigs at weaning time, because of weaning a larger number per sow. The average corn consumed per 100 pounds for the 1-litter system was 401.1 pounds for the years 1921 and 1922. When fall pigs were added, the corn consumed increased to 405.6 pounds. Larger quantities of oats and other small grains were consumed on the 1-litter farms, but the total of tankage, skim milk, and other protein feeds was higher on the 2-litter farms.

The labor required to care for the hogs when one litter was produced was 1.53 hours man labor and 0.29 hour horse work per 100 pounds for the 2 years. The greater care required of fall pigs during the winter months increased the average when two litters were raised to 1.70 hours man labor and 0.41 hour horse work. However, the winter labor on fall pigs usually comes at a time when there is nothing much else to do.

The economy of producing two litters per year is shown in the capital investments required. The capital investments used per 100 pounds produced by the 1-litter system was $2.60 in equipment, $1.32 in lot, and $2.42 in the breeding herd. The larger volume of pork produced under the 2-litter system brought the investments per 100 pounds to $1.99 in equipment, $1.19 in the lot, and $1.73 in the breeding herd.

The average quantities of feeds, labor, and other factors required per 100 pounds is given separately for the years 1921 and 1922 in Table 4. The larger quantities of farm-grown feeds fed the second year is interesting evidence of the hog producer's effort to produce pork with as little purchased feed as possible.

TABLE 4.—*Average quantities of feed, labor, and other factors required to produce 100 pounds of pork*

Basic factor of cost	One litter per year			Two litters per year		
	1921	1922	Average	1921	1922	Average
Pounds of pork produced	614,959	340,332	[1] 955,291	456,668	698,251	[1] 1,154,919
Feeds:						
Corn ..... pounds	399.5	404.0	401.1	407.0	404.6	405.6
Oats ..... do	17.2	28.4	21.2	21.0	18.2	19.3
Other grain ..... do	.7	2.5	1.4	.1	.3	.2
Soy beans ..... do	.3	5.1	2.0	.4	5.1	3.2
Tankage ..... do	10.4	7.0	9.2	13.3	8.5	10.4
Skim milk ..... do	19.1	9.9	15.8	32.3	21.4	25.7
Other proteins ..... do	4.1	6.0	4.8	.2	1.1	.8
Mill feeds ..... do	.7	.2	.5	1.6	1.0	1.2
Pasture unit days [2]	3.70	3.09	3.48	3.27	2.99	3.10
Labor:						
Man hours	1.53	1.53	1.53	1.73	1.68	1.70
Horse hours	.29	.30	.29	.34	.46	.41
Investment in equipment	2.69	2.43	2.60	2.49	1.67	1.99
Investment in lot	1.17	1.60	1.32	1.24	1.15	1.19
Investment in breeding herd	2.39	2.48	2.42	1.73	1.74	1.73

[1] Total pounds of pork produced.
[2] A "pasture unit day" is a day spent on pasture by one animal unit of hogs. See footnote on page 21 for definition of an animal unit of hogs.

ANALYSIS OF COST OF PRODUCTION DATA

The pork production process divides itself naturally into two distinct phases: (1) The management of the breeding herd for the purpose of raising weanling pigs, and (2) the fattening of those pigs for market. Each phase presents different problems for the producer. He may be successful in the first phase and a failure in the second, or

the reverse may be true. This study presents many degrees of success among hog raisers and shows some of the possibilities for more efficient production.

COST OF MAINTAINING THE BREEDING HERD

Management of the breeding herd involves the control and development of the maternal function of swine. There are general laws of physiology, nutrition, and sanitation which must be obeyed to comply fully with the demands of nature in this respect. Large, strong, healthy litters can be raised only when these requirements are supplied in one way or another. Maximum herd performance can be maintained only when the breeding stock is sound and vigorous (fig. 6), is fed to nourish embryonic litters properly, and guarded against barrenness and abortion by proper sanitation. There is a distinct advantage for the two-litter system of production, because

FIG. 6.—When snow covered the hog pastures on this farm rough feed was supplied the breeding gilts by throwing alfalfa hay and soy beans to them. These gilts produced thrifty spring pigs

the greater number of pigs produced per sow lowers the cost of maintaining the breeding herd per pig.

As the maintenance of the breeding herd is a large item of cost in pork production, it will be well to consider the relation of cost of maintaining the breeding herd to the entire pork production process. Table 5 shows the relation which exists between the number of pigs weaned per sow and the cost of maintenance of the breeding herd per pig and the gross cost of 100 pounds gain. This table shows clearly that maximum herd performance is desirable although the cost of maintaining the sow may be increased. Better feed and wise management may result in greater cost per sow, but this expenditure is a real saving if better and more pigs are produced. The economic advantage to the pork producer of raising as many pigs per sow as possible is worthy of attention. The burden of a high cost of maintenance of the breeding herd is a handicap upon the weanling pig and is a large factor in determining profit or loss. Reduced cost has the same effect upon profit as an increased sale price.

TABLE 5.—*Relation of number of pigs weaned per sow bred to the gross cost of maintaining the breeding herd, per pig weaned and the gross cost of 100 pounds of pork*

Number of pigs weaned per sow bred	1921			1922		
	Number of droves [1]	Gross cost		Number of droves [1]	Gross cost	
		Per pig weaned	Per 100 pounds pork		Per pig weaned	Per 100 pounds pork
One litter per year:						
2 to 4	11	$6.68	$6.56	4	$8.12	$7.82
4 to 6	11	4.44	5.30	9	3.85	6.40
6 to 8	6	3.38	4.60	2	3.33	5.41
Two litters per year:						
4 to 7	3	4.81	6.58	4	4.59	6.65
7 to 10	6	3.87	5.78	10	3.36	6.25
10 to 13	6	3.07	5.13	8	2.75	5.82

[1] System of hog management on one farm in 1921 and two farms in 1922 did not permit recording exact number of sows bred for fall litters. These farms are not included in this table.

The cost per sow should be kept as low as is consistent with large litters to give the greatest advantage to the pigs. A desire to reduce the cost of maintenance may result in the insufficient nutrition of the gestating sows. Under these conditons the litters may be small and contain dead and weak pigs. The reverse may also be true; that in an endeavor to raise large, strong, healthy litters the breeding herd may be given unnecessarily expensive feeds resulting in a higher cost of maintenance and no greater herd performance. The varying results which different producers obtained, as found in this study, seem to indicate that success does not depend upon any one method. Any system of management or feeding is inadequate unless accompanied by forethought and patient care on the part of the herdsman, which seem to be compensated by savings resulting from more efficient production.

The cost of carrying the breeding herd, as presented in this study, included the period of the production year, or from the time the sows were selected for spring-pig breeding to the time of breeding for spring pigs the following year. The feed charged includes that fed to the boars while they were on the farm and to the sows during the gestation, suckling, and fattening periods in case some of the sows were sold. Many causes of variation in the cost of maintaining the breeding herd are evident, such as length of time on the farm, the weight and amount of gain put on the breeding herd, character of ration fed, price of feeds, number of pigs suckled, and the length of the suckling period.

An explanation of the cost of maintenance per sow will aid in comparing these costs. The number of sows bred during the year was used as the basis for computing the cost of maintenance per sow. The length of time on the farm, which has a large influence on the cost per sow, is influenced by the number of sows sold early in the year because of barrenness or abortions, and the proportion of the breeding herd which is rebred for fall litters. In some of the data the cost is presented per sow per month to eliminate the effect of time. The cost of keeping the boar while he was on the farm is included among the items making up the cost per sow.

In 1921, the average gross cost of maintenance per sow bred for the one-litter producers was $22.62 for an average period of 8.04 months. In 1922, for a similar class of producers the average cost was $19.74 per sow bred for a period of 7.47 months. The cost per sow bred was equivalent to a cost of $2.81 per month in 1921 and $2.64 per month in 1922. When the cost of maintenance of the breeding herd is expressed in terms of weaned pigs, it equaled $4.75 per pig in 1921 and $4.61 in 1922. The appreciation, or average increase in value per sow, was only 65 cents in 1921 but increased to $5.50 in 1922. This large increase in value is accounted for by falling hog values in 1921 and rising hog values in 1922. Appreciation in value of the breeding herd amounted to 14 cents per pig in 1921 and $1.28 in 1922.

The farms producing 2 litters per year had an average gross cost of maintenance of the breeding herd per sow bred of $26.04 for an average period of 10.26 months in 1921 and $21.33 for 9.37 months in 1922. This was equivalent to $2.54 per month in 1921 and $2.28 per month in 1922. On the basis of total spring and fall pigs weaned the gross cost of maintenance was $3.57 per pig in 1921 and $3.35 in 1922. Appreciation in value of the breeding herd was $1.13 per sow in 1921 and $5.24 in 1922. These costs are itemized and presented in Table 6 for one and two-litter systems of production.

TABLE 6.—*Average cost of maintenance of the breeding herd for the years 1921 and 1922*

Item	One litter per year				Two litters per year			
	1921		1922		1921		1922	
	Per sow	Per pig	Per sow	Per pig	Per sow	Per pig	Per sow	Per pig
Number of herds	28		15		16		24	
Number of sows	567		329		298		531	
Number of months on farm	8.04		7.47		10.26		9.37	
Items of cost:								
Feed	$13.05	$2.74	$12.21	$2.85	$14.75	$2.02	$13.18	$2.07
Pasture	1.15	.24	.76	.18	1.45	.20	1.04	.16
Labor	2.34	.49	1.87	.44	3.20	.44	2.43	.38
Equipment	1.12	.24	1.16	.27	1.33	.18	.84	.13
Veterinary			.01		.01		.08	.01
Overhead	.59	.12	.50	.12	.66	.09	.55	.09
Death risk	1.57	.33	.61	.14	.97	.13	.68	.11
Taxes, incidentals	.30	.06	.17	.04	.40	.06	.25	.04
Interest on breeding herd	1.20	.25	1.11	.26	1.67	.23	1.27	.20
Interest on lot and equipment	1.30	.28	1.34	.31	1.60	.22	1.01	.16
Gross cost per year	22.62	4.75	19.74	4.61	26.04	3.57	21.33	3.35
Appreciation in value	.65	.14	5.50	1.28	1.13	.15	5.24	.82
Net cost	21.97	4.61	14.24	3.33	24.91	3.42	16.09	2.53
Gross cost per month	2.81		2.64		2.54		2.28	

A comparison of average costs of the breeding herds when one and two litters are raised each year shows that the cost of maintenance per sow for the year is somewhat higher when two litters are raised, largely because they are on the farm for a longer period of time. When they were reduced to a monthly basis there was practically no difference during this two-year study.

TABLE 7.—*Average quantities of feed and labor required to maintain the breeding herd for one production season*

Item	One litter per year				Two litters per year [1]			
	1921		1922		1921		1922	
	Per animal per season	Per animal per month	Per animal per season	Per animal per month	Per animal per season	Per animal per month	Per animal per season	Per animal per month
Number of animals (sows and boars)	606		345		316		561	
Initial weight per animal	250		238		251		242	
Average gain per animal	97		79		79		98	
Number months on farm	8.04		7.47		10.26		9.37	
Feeds consumed:								
Corn—pounds	1,177.2	146.4	1,067.5	142.9	1,387.7	135.3	1,275.5	136.1
Other grains—do	103.0	12.8	150.4	20.1	107.2	10.4	68.6	7.3
Tankage—do	29.4	3.6	29.4	3.9	35.6	3.5	19.8	2.1
Skim milk—do	90.2	11.2	47.2	6.3	155.0	15.1	110.9	11.8
Soy beans—do	2.0	.2	1.7	.2			5.6	.6
Oilmeal—do	8.0	1.0	4.8	.6	2.5	.2	.5	.1
Hog meal—do			28.5	3.8			3.8	.4
Mill feeds	4.4	.5	.8	.1	7.2	.7	3.2	.4
Pasture: Days	112		80		140		122	
Labor: Man hours	8.28	1.03	7.81	1.04	11.68	1.14	9.28	.99
Horse hours	.77	.10	.34	.04	.82	.08	1.25	.13

[1] 76 per cent of sows farrowing spring pigs were bred for fall pigs in 1921; 57 per cent of sows farrowing spring pigs in 1922 were bred for fall pigs.

About 200 pounds more grain is required for each animal in the breeding herd to produce two litters per year than one litter. The quantity of corn consumed per animal in the breeding herd averaged 1,122 pounds for the years 1921 and 1922 when one litter was produced and 1,331 pounds when two litters were produced. Various miscellaneous feeds totaled 250 pounds per animal in the breeding herd for one litter and 260 pounds for two litters per year. Sows producing two litters per year were on the farm for a longer period of time and made greater use of pasture during the summer. When these requirements are computed on a monthly basis, the sows producing only 1 litter required 177 pounds of corn and other feeds per month, whereas the sows producing 2 litters required 162 pounds of corn and other feeds. The average quantities of feed and labor per sow is given in Table 7.

LOSSES IN THE PIG CROP

The economic advantage which some producers obtain by weaning a large number of pigs per sow has been presented. All of this advantage can not be credited to luck. The lack of care and proper management at critical times was the direct cause of severe losses in some cases. Severe weather conditions increase the difficulties but field observations indicate that some herdsmen save more pigs than others under any conditions. Some hog raisers made little effort to save more pigs. Others who tried were not thorough in their sanitary methods and little good was accomplished.

The causes of losses in pigs before weaning and the average number lost for each 1,000 pigs farrowed is given in Table 8. The exact cause of death in some cases is in doubt. Many of the miscellaneous deaths should be distributed among the other causes. Losses from necrobacillosis included losses from enteritis, bull-nose, and sore

mouth (known as stomatitis). Losses classed as miscellaneous, from known and unknown causes, indicate a lack of attention to the pigs on the part of some farmers, the losses of pigs sometimes not being detected until too late to determine what caused their death or disappearance. These conditions make definite records on all losses often impossible. This is especially true of fall pigs where they are left to shift for themselves.

The severe weather in the spring of 1922 caused a much heavier loss among the spring pigs than in 1921. The average number of pigs lost before weaning in the spring of 1921 was 31.5 per cent of those farrowed, and in 1922, 40.3 per cent. The weather made it necessary to house the sows and litters for a much longer period in the spring of 1922, which increased the percentage of pigs overlaid from 9.4 per cent in 1921 to 15.5 per cent in 1922. The methods of preventing losses from many of these causes are well understood by hog producers. Their prevention is possible with proper care and management and does not always involve professional services.

TABLE 8.—*Causes of losses in the pig crop from farrowing to weaning; number lost in each 1,000 pigs farrowed*

Cause	Spring litters		Fall litters	
	1921	1922	1921	1922
	Number in 1,000	*Number in 1,000*	*Number in 1,000*	*Number in 1,000*
Overlaid	94.0	155.2	56.4	101.0
Farrowed dead	52.3	61.8	65.0	33.3
Farrowed weak	46.7	43.4	14.9	16.7
Starved	16.9	15.6	16.0	22.2
Chilled	14.7	32.4		
Necrobacillosis	43.8	28.8		1.5
Eaten by sows	8.0	7.8		13.6
Scours	18.5	12.5		
Injured by stock	3.9	1.3	3.2	10.1
Thumps	1.3	3.5		
Drowned	2.2		9.6	6.0
Worms		2.0		
Killed by operator		.2		
Mange		2.0		
Milk fever			7.4	3.5
Hot weather			19.2	
Wet weather			19.2	
Given away		.6		
Ruptured		.4		
Castration		.4		
Miscellaneous	12.5	35.4	145.9	121.7
Number of pigs lost	314.8	403.3	356.8	329.6
Number of pigs weaned	685.2	596.7	643.2	670.4

The relative importance of the pigs lost before weaning may be realized by comparing these losses with the uses made of the pigs which are weaned. The average losses before weaning were 35.4 per cent of the total number of spring and fall pigs farrowed in 1921 and 1922. Of the 64.6 per cent which were weaned, 6 per cent died before reaching market, 7.4 per cent were selected for breeding purposes, 1.2 per cent were butchered for home use, and 50 per cent were sold on the markets. The number of pigs dying both before and after weaning was 41.4 per cent of the total number farrowed. This distribution of the pig crop is shown in Table 9.

TABLE 9.—*Average disposition of each 1,000 pigs farrowed*

Where pigs went	Spring litters			Fall litters			Average [1] spring and fall
	1921	1922	Average [1]	1921	1922	Average [1]	
Lost before weaning	314.8	403.3	357.8	356.8	329.6	339.6	353.6
Weaned	685.2	596.7	642.2	643.2	670.4	660.4	646.4
Died after weaning	45.0	48.7	46.8	88.9	116.2	106.2	60.3
Selected for breeding herd	95.0	85.4	90.2	37.8	10.0	20.2	74.4
Butchered for home use	13.7	14.6	14.2	4.7	1.8	2.9	11.6
Sold on market	531.5	448.0	491.0	511.8	542.4	531.1	500.1

[1] 2-year weighted average.

The number of pigs dying after weaning was 6.0 per cent of the total number of pigs farrowed in the spring and fall of both 1921 and 1922. The death losses for the spring pigs alone was 4.5 per cent in 1921 and 4.9 per cent in 1922. The losses for the fall pigs was 8.9 per cent in 1921 and 11.6 per cent in 1922. The number of pigs dying after weaning from various causes is given in Table 10 for the spring and fall pigs. Since no diagnosis was made to determine the exact cause of death, this classification of causes of deaths is only indicative and not absolute.

TABLE 10.—*Causes of losses in pigs after weaning (number lost in each 1,000 weaned)*

Cause	Spring litters		Fall litters		Cause	Spring litters		Fall litters	
	1921	1922	1921	1922		1921	1922	1921	1922
Missing	22.4	30.4	12.2	41.6	Sick	.5	.6	3.7	------
Unknown	7.2	7.9	26.9	6.2	Smothered	.2	------	6.1	10.4
Miscellaneous	3.2	9.2	------	23.5	Runts	------	3.5	12.2	38.7
Injured	3.2	4.4	4.9	2.1	Too much milk	.5	------	------	------
Influenza	13.8	10.1	44.1	32.5	Necroenteritis	1.0	------	------	------
Cholera	6.4	.6	------	------	Sore mouths	1.2	------	------	------
Castration	1.2	.6	------	4.8	Swollen joints	------	.6	------	------
Rupture	.7	4.1	1.2	.7	Choked	------	.3	------	------
Vaccination	1.0	2.5	------	------	Scours	------	.3	------	------
Drowned	.7	.6	------	.7	Heat	------	------	1.2	------
Thumps	1.0	2.2	------	------	Worm medicine	------	------	7.3	------
Worms	2.0	2.9	18.4	13.9	Mange	------	------	------	.7
Lockjaw	.5	.3	------	------	Blood poison	------	------	------	.7
Heat prostration	.3	4.1	------	------					
Mixed infection	.5	2.9	------	------	Total	67.5	88.1	138.2	176.5

The failure of sows to farrow may be a cause of financial loss to the producer. If the sows gain sufficiently to pay for their feed, the principal loss will be a short pig crop. Since young gilts are more likely to pay for their feed than old sows, many producers breed extra gilts as a form of insurance against failures to farrow, but many of the best producers strive to keep their breeding herds working to their full capacity. The sows that farrowed spring pigs in 1921 were 87 per cent of the number of sows bred. In 1922, 88 per cent of the sows bred for spring litters farrowed pigs. Of the failures to farrow, 8 per cent were due to barrenness, 3 per cent to abortions, and 2 per cent to deaths in 1921; and 8 per cent to barrenness, 3 per cent to abortions, and 1 per cent to deaths in 1922. In 1921, 23 of 61 producers succeeded in getting all of the sows to farrow; in 1922, 11 of 39 producers were as successful. The details of these variations are shown in Table 11.

COST OF FATTENING PIGS FOR MARKET

There are three major and two minor classes of pigs when grouped according to time they are farrowed. Early spring, late spring, and fall pigs are much the larger classes; summer and winter pigs are sometimes interspersed among these classes. Figure 7 shows the

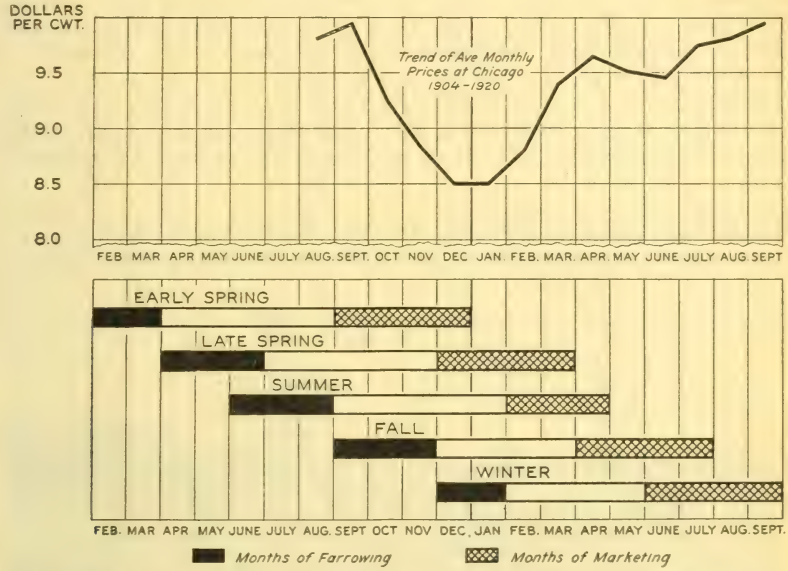
DOLLARS PER CWT.
9.5
9.0
8.5
8.0
Trend of Ave Monthly Prices at Chicago 1904-1920
FEB MAR APR MAY JUNE JULY AUG. SEPT. OCT NOV DEC JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT
EARLY SPRING
LATE SPRING
SUMMER
FALL
WINTER
FEB. MAR APR MAY JUNE JULY AUG. SEPT OCT NOV DEC. JAN FEB. MAR APR MAY JUNE JULY AUG. SEPT.
Months of Farrowing
Months of Marketing

FIG. 7.—This figure shows the months when pigs are farrowed and periods during which the major portion of each class is marketed. Usually the early months of marketing for each kind of pigs farrowed are the most profitable, unless the ratio of hog prices to corn prices in any one year increases in favor of hogs as they are fed past the early market

relation of the time of farrowing of each of these classes and their respective usual months of marketing. With the months of marketing is shown the trend of monthly hog prices at Chicago for the 17 years, 1904 to 1920. This figure shows the effect upon price of the marketings of the various classes of pigs.

TABLE 11.—*Variation in the percentage of sows farrowing and the principal reasons why other sows did not farrow*

Variation in percentage of sows that farrowed	1921					1922				
	Number of farms	Average percentage farrowing	Percentage not farrowing			Number of farms	Average percentage farrowing	Percentage not farrowing		
			Barren	Aborted	Died			Barren	Aborted	Died
40 to 50	1	45	50		5					
50 to 60	1	59	23	14	4					
60 to 70	3	63	34	3		4	66	29	5	
70 to 80	6	75	18	5	2					
80 to 90	16	83	8	6	3	10	83	11	5	1
90 to 100	11	92	3	3	2	14	94	3	2	1
100	23	100				11	100			
Average	[1] 61	87	8	3	2	39	88	8	3	1

[1] Includes 17 farms on which farrowing records were obtained but on which complete cost records after farrowing were not kept because of too complicated herd management or lack of cooperation from producer.

General breeding and feeding practices of producers have built up this relationship of production to price. The usual scarcity of hogs in the fall has made the September market the highest of the year. Early spring pigs are raised to take advantage of this price. These pigs are full-fed and pushed to the limit. If good gains are not made they lose the advantage of an early birth and must be sold after the decline in price. Early spring pigs benefit by a higher price, but they suffer from a higher cost of production largely because of the high price of old corn and purchased supplementary feeds, necessary for maximum gains, on which they are fattened.

Late spring pigs are on limited feed and pasture during the summer and are fattened on new corn, large quantities of which are hogged down. They furnish the bulk of the supply in the heavy winter-pack-

FIG. 8.—This field of clover was pastured by hogs all summer. A crop of hay and a crop of seed were taken off without interfering with the hog pasture

ing season when prices are lowest. The disadvantage of a low price is offset in some degree by a lower cost of production, largely because of greater use of pasture (fig. 8) better gains made on soy beans and new corn which is also lower in price, and labor saved by hogging down corn. The large runs from this class of pigs bring the market to the lowest of the year.

Fall pigs are usually on full feed during the winter and spring until they are marketed. The marketing of these pigs causes a slight June break in the general rise of prices from the low in January to the high in September. Summer pigs are really fall pigs farrowed early in order to reach market before the June break, and winter pigs are really spring pigs farrowed early to make sure of reaching the high fall market of August and September.

The average cost of 100 pounds gain for spring pigs after weaning was $4.17 in 1921 and $5.40 in 1922. The cost of gain for fall litters was $5.26 in 1921 and $6.37 per 100 pounds in 1922. The cost of gain for each year was approximately $1 greater for fall pigs than for spring pigs. The greater cost of gain for fall pigs was due not only to larger quantities of feed and labor being consumed but to higher prices for the feeds. In 1921 the average farm price of corn was 32 cents per bushel for the spring pigs and 41 cents for the fall pigs. In 1922, the price of corn having advanced, the average monthly farm price of corn was 53 cents for the spring pigs and 61 cents for the fall pigs. The feed cost was 66.3 per cent of total cost of gain for spring pigs in 1921 and 79.1 per cent in 1922. The feed cost for the fall pigs was 76.4 per cent of total cost in 1921 and 81.8 per cent in 1922. A comparative itemized statement of the cost of 100 pounds gain after weaning for spring and fall litters is given in Table 12. The cost of producing the weanling pig must be added to the cost of gain after weaning to secure the gross cost of producing pork.

TABLE 12.—*Comparative statement of average cost of 100 pounds gain from spring and fall pigs*

Item of cost	1921		1922	
	Spring pigs	Fall pigs	Spring pigs	Fall pigs
Number of farms	44	16	39	24
Pounds gain per farm	16,683	7,680	15,681	7,941
Operating costs:				
Feed	$2.77	$4.02	$4.27	$5.22
Pasture	.39	.15	.25	.10
Labor	.28	.39	.27	.43
Equipment	.14	.13	.11	.12
Veterinary	.32	.25	.22	.17
Overhead	.12	.15	.15	.18
Interest on lot and equipment	.15	.17	.13	.15
Gross cost	4.17	5.26	5.40	6.37

The total cost of gain after weaning for spring litters varied from $2.36 to $6.94 per 100 pounds in 1921 and from $3.71 to $10.10 in 1922. The feed cost, exclusive of pasture, varied from $1.26 to $4.46 per 100 pounds in 1921 and from $2.44 to $5.60 in 1922. The total cost of 100 pounds gain for fall pigs after weaning varied from $3.86 to $8.66 in 1921 and from $4.31 to $8.37 in 1922. The feed cost of pork produced from fall pigs exclusive of pasture, varied from $3 to $6.36 per 100 pounds in 1921 and from $2.98 to $6.18 in 1922.

The share of gain produced in the various cost groups within these extremes of variation is given in Table 13. In 1921 the bulk of the gain, 81.8 per cent of the gain made by the spring pigs on which records were obtained, was made at a cost between $3 and $5 per 100 pounds. In 1922, the cost of 80 per cent of the gains were within the $4 to $6 range. About 72 per cent of the gains made by the fall pigs of 1921 cost more than $4 and less than $6 per 100 pounds; in 1922 the cost of 85 per cent of the gain ranged from $5 to $8 per 100 pounds.

TABLE 13.—*Percentage distribution of gains after weaning, by cost groups*

Kind of pigs	Spring		Fall	
	1921	1922	1921	1922
Total pounds gained after weaning	700,678	549,493	107,519	158,811
Cost group (per cent of above totals):				
$2 to $3	7			
$3 to $4	36	4	6	
$4 to $5	46	25	56	10
$5 to $6	7	55	16	13
$6 to $7	4	13	10	51
$7 to $8			8	20
$8 to $9		2	4	6
$9 to $10				
$10 to $11		1		

QUANTITIES OF FEED AND LABOR REQUIRED FOR 100 POUNDS GAIN ON SPRING AND FALL PIGS

The fattening period of spring and fall litters may also be compared in terms of the quantities of feed and labor necessary to produce 100 pounds gain. The average quantities of feed, pasture, and labor consumed by the spring and fall pigs of 1921 and 1922 are given in Table 14. A combined average of these two years is also given for

FIG. 9.—Fields were arranged on this farm so that to get to the cornfield from the watering trough hogs had to cross a patch of soy beans. This lessened the risk of turning hogs out into the corn

spring and for fall litters. This combined average is based on the items necessary to produce 1,250,171 pounds gain on spring pigs and 266,330 pounds on fall pigs. The average corn consumed per 100 pounds gain by the spring pigs was 375.8 pounds and 404.8 pounds by the fall pigs, or a difference of 29 pounds in favor of the spring pigs. Other farm-grown feeds and purchased protein supplements were fed in larger quantities to the fall pigs than to the spring pigs. The smaller quantity of grain consumed by the spring pigs may be due in part to the greater use of pasture, as the spring pigs

grazed on pasture for an average of 3.19 pasture unit days [5] and the fall pigs 1.38 per 100 pounds gain.

TABLE 14.—*Average quantities of feed, labor, and other costs required to produce 100 pounds gain after weaning*

Item	Spring pigs			Fall pigs		
	1921	1922	Average	1921	1922	Average
Number of droves	42	35	77	[1] 14	20	[1] 34
Number of pounds gain	700,678	549,493	1,250,171	[1] 107,519	158,811	[1] 266,330
Items of cost:						
Feeds—						
Corn, pounds	372.9	379.4	375.8	413.4	399.0	404.8
Oats, do	10.1	15.7	12.6	25.4	19.6	21.9
Other grain, do	.5	1.0	.7	.2	1.3	.8
Soy beans, do	.2	7.8	3.5	.8	1.5	1.2
Tankage, do	11.2	6.2	9.0	15.5	13.0	14.0
Skim milk, do	15.6	9.5	12.9	39.1	9.7	21.6
Other proteins, do	2.9	2.1	2.6	----------	1.0	.6
Mill feeds, do	.2	.1	.2	2.8	.4	1.4
Pasture: Unit days	3.28	3.07	3.19	1.80	1.09	1.38
Labor: Man hours	.92	.93	.93	1.29	1.52	1.43
Horse hours	.29	.36	.32	.48	.57	.53
Veterinary	$0.32	$0.22	$0.27	$0.22	$0.17	$0.19
Other costs	.11	.15	.13	.14	.18	.16

[1] Totals of droves and pounds of gain.

The average amount of labor required during 1921 and 1922 per 100 pounds gain was 0.93 hour of man labor and 0.32 hour of horse labor for the spring pigs and 1.43 hours man labor and 0.53 hour horse labor for the fall pigs. Veterinary, vaccination, medicine, and other costs were 27.2 cents per 100 pounds for the spring pigs and 18.9 cents for the fall pigs. Other miscellaneous costs were 13.1 cents for spring pigs and 16.3 cents for fall pigs per 100 pounds gain.

The average amounts of feed, pasture, and labor consumed by spring and fall pigs when grown to different weights are given in Table 15. This table shows that there is a regular increase in grain consumed when pigs are fed to heavier weights and also the heavier grain requirement of fall pigs compared with spring pigs of similar weight. The quantity of corn consumed by the class of spring pigs averaging 125 pounds in weight was 294.3 pounds, and by the class averaging 275 pounds the corn consumption was 405.2 pounds.

[5] An animal unit of hogs is the equivalent of hogs in other livestock. The animal units were computed each month and the actual number of days on pasture determined. Since swine can not handle roughage as well as ruminants do, the following schedule adapted from data by the department of farm organization and management of the University of Illinois was used in converting the hogs into animal units instead of the 5 sows or 10 pigs ratio frequently used:

Weight of pigs	Weight per animal unit	Pigs per animal unit
30 pounds	1,720 pounds	57
40 pounds	1,790 pounds	45
50 pounds	1,860 pounds	36
60 pounds	1,930 pounds	32
70 pounds	2,000 pounds	29
80 pounds	2,070 pounds	26
90 pounds	2,140 pounds	24
100 pounds	2,210 pounds	22
120 pounds	2,350 pounds	20
140 pounds	2,490 pounds	18
160 pounds	2,630 pounds	16
180 pounds	2,770 pounds	15
200 pounds	2,910 pounds	14

[1] Nine sows and their litters per animal unit.

The increase in corn consumed per 100 pounds for each successive 50-pound average sales weight group was 63.4 pounds, 22.2 pounds, and 25.3 pounds. Some of the fall pigs were sold as feeders and the corn consumed by this class averaging only 75 pounds was 396.5 pounds. The corn consumed by the class averaging 125 pounds was 403.2 pounds, for the 175-pound class 413.6 pounds, and for the 225-pound class 395.9 pounds of corn. The decrease in the quantity of corn consumed by this heavy class of fall pigs is due to the influence in the class of two large especially well fed droves whose average was much better than the others and to the quantity of oats and skim milk fed to this group.

TABLE 15.—*Average quantities of feed, pasture, and labor required to grow pigs to various weights*

Class of pigs	Spring pigs				Fall pigs			
Weight at which pigs were sold—pounds	100 to 150	150 to 200	200 to 250	250 to 300	50 to 100	100 to 150	150 to 200	200 to 250
Number of droves	3	29	37	8	4	5	16	8
Average weight per head—pounds	131	184	223	261	84	125	171	226
Feed consumed per 100 pounds gain from weaning:								
Corn—pounds	294.3	357.7	379.9	405.2	396.5	403.2	413.6	395.9
Oats—do	21.2	12.0	11.3	15.7	22.9	20.3	17.0	34.0
Other grains—do	-------	1.4	.1	1.2	1.6	4.4	.4	-------
Tankage—do	3.0	9.2	7.2	11.2	13.8	12.6	17.3	7.8
Other proteins—do	-------	1.5	4.5	1.9	4.7	2.4	-------	.3
Soy beans—do	-------	3.0	5.3	.8	-------	5.3	.4	1.3
Skim milk—do	9.4	17.8	12.0	2.7	64.4	6.1	10.6	45.6
Mill feeds—do	-------	.5	.1	-------	4.7	.3	.3	3.6
Pasture days per 100 pounds gain	4.1	3.9	3.1	2.5	2.6	.5	1.2	1.8
Estimated total feed units	354	428	445	465	490	465	472	471
Pasture days per pig	4.1	5.9	5.8	5.8	1.4	.4	1.7	3.4
Labor: Man hours per 100 pounds gain	1.22	1.06	.87	.80	3.18	1.64	1.34	1.16
Horse hours per 100 pounds gain	.37	.33	.29	.28	.49	.43	.54	.55

Pasture was used in approximately equal amounts by the spring pigs of different weights. The time of grazing on pasture for the three weight classes above 150 pounds was 5.8 animal unit days per pig. The pigs in the light-weight class below 150 pounds were sold before the close of the pasture season and had spent only 4.1 animal unit days per pig grazing on pasture. The pasture used by the fall pigs was largely used in the spring following their farrow. Many of these fall pigs were sold before the pasture season. Greater use was made of pasture as the fall pigs were made heavier. When the time spent on pasture is expressed per 100 pounds gain, the heavier classes of spring pigs show a smaller use than the lighter classes, because of a greater gain in dry lot after the pasture season.

COST ELEMENTS OF PORK PRODUCTION

Variations in cost of production result from different combinations of cost elements and variations in the price of these cost elements. The variations which have been shown to exist in the cost of producing pork suggest the possibility of more standardized production practices.

The average feed cost on these farms was 64 per cent of the total cost of pork production in 1921 and 75 per cent in 1922. The variation in percentage which feed was of total cost is shown in the frequency distribution, Table 16 for 1921 and 1922. The feed cost per

100 pounds gain has been presented graphically for each farm in Figures 4 and 5. In 1921 the feed cost per 100 pounds of marketable

FIG. 10.—Fall pigs using rye as early spring pasture. These pigs were turned onto rye March 15 and held there for 15 days before going onto clover pasture

pork varied from $2.03 to $6.26 and averaged $3.51. The influence of rising grain prices in 1922 increased the average feed cost to $4.72 and the variations from $3.16 to $6.62 per 100 pounds.

TABLE 16.—*Relation of feed cost to total cost of 100 pounds of pork*

Percentage feed cost was of total cost	Number of farms	
	1921	1922
40 to 50	2	
50 to 60	16	4
60 to 70	21	6
70 to 80	5	24
80 to 90		5

The farm values of feeds were used in this study. The prices were determined monthly by deducting from the Chicago price the local elevator's margin and the cost of hauling from the farm to the shipping point. The cost of shelling and grinding is included in the cost of feed.

Feeds and grain purchased were charged at the price paid plus the cost of hauling to the farm. The cost of husking was deducted if any corn was hogged down. The averge prices of the feeds consumed in the different periods of the pork production process are given in Table 17. The average price of corn rose from 36 cents a bushel in 1921 to 52 cents in 1922, with other feeds in proportion. In 1922 the corn price increased 44 per cent, the feed cost 34 per cent, and the total cost of pork 15 per cent over 1921.

TABLE 17.—*Average price of feeds fed to hogs produced in 1921 and 1922 on the farms under study*

Feed	1921					1922				
	Total pork	Breeding herd	Fattening pigs			Total pork	Breeding herd	Fattening pigs		
			Spring	Fall	Average			Spring	Fall	Average
Corn, bu.	$0.36	$0.44	$0.32	$0.41	$0.34	$0.52	$0.45	$0.53	$0.61	$0.55
Oats, bu.	.28	.29	.25	.29	.26	.31	.29	.30	.36	.32
Rye, bu.						.75	.82	.73	.80	.73
Soy beans, bu.	1.38	1.50	1.37	1.25	1.33	1.03	1.02	1.01	1.17	1.02
Tankage, ton	3.04	3.38	2.91	3.11	2.94	3.34	3.17	3.36	3.50	3.40
Skim milk, 100 lbs.	.29	.29	.30	.30	.30	.30	.30	.31	.30	.30
Oil meal, 100 lbs.	2.11	2.45	2.02	2.25	2.02	2.34	2.32	2.25	2.79	2.34
Pig chow, 100 lbs.						2.41	2.15	2.87	2.50	2.83

The labor charge is the second largest item in the cost of producing pork on the farm and constituted 8.4 per cent in 1921 and 7.1 per cent in 1922 of total cost of production (See Table 2). It includes time spent directly in caring for the hogs from the time the sows were bred until the entire crop of pigs was sold. Man labor and horse work is the time required to haul feed, water, bedding, hauling pigs to market, time used in vaccination, castration, worming, repairing, and fencing for hogs and all other items of labor which were put upon the hogs. A flat labor charge of 25 cents per hour man labor and 13 cents per hour horse work was used in 1921 and 22 cents and 15 cents per hour respectively for man labor and horse work in 1922.

The charge for labor, both man and horse, per 100 pounds of marketable pork in 1921 varied from $0.23 to $1.63 and averaged 46 cents. In 1922 the average was 45 cents per 100 pounds and the range from 23 cents to $1.47. The variation in labor charge for each farm has been presented graphically in Figures 4 and 5. The amount of time spent on the hogs in the different periods of the pork production process has been given in the various tables of unit requirements.

The cost of equipment is the third largest item in the cost of growing pork when interest on the investment in equipment is combined with the equipment charge (depreciation, upkeep, and taxes upon equipment). The average cost of producing 100 pounds of pork given in Table 2 shows a charge of 20.9 cents for equipment (depreciation, upkeep, and taxes) and 24.6 cents for interest on investment in lot and equipment for 1921, and 16.9 cents for the equipment charge and 20.5 cents for interest on investment in lot and equipment for 1922. The production of fall pigs was a factor in bringing the cost of equipment per 100 pounds on farms raising two litters per year below the cost of equipment per 100 pounds when only one litter per year was produced.

The inventory of hog equipment includes permanent and movable types of houses, self feeders, waterers, oilers, troughs, and all other minor equipment. In 1921 the value of the hog equipment per farm varied from $194 to $2,086 and averaged $669. In 1922 with a few changes in the farms that kept records the value of equipment varied from $152 to $1,909 and averaged $571 per farm.

Farm improvements should be made to produce more efficiently, to perform the work with more convenience, and to better the general appearance of the farm layout. This study of costs and methods of pork production seems to indicate that many farmers do not get more economical production of pork through the use of more expensive equipment.

None of these hog farms are extravagantly equipped for hog production. Only a few of them have hog houses costing over $1,000. The average investment in equipment per sow was approximately $34 on farms studied in 1921 and $26.50 on the farms in the 1922 study. When breeding operations are being reduced, and fewer sows are bred, the burden of equipment costs per sow will be even greater.

The farms that had the larger equipment charge per sow produced somewhat larger litters. Among the spring litters the number of pigs weaned per sow increased along with the better equipment; but the amount and the cost of equipment did not appear to have so

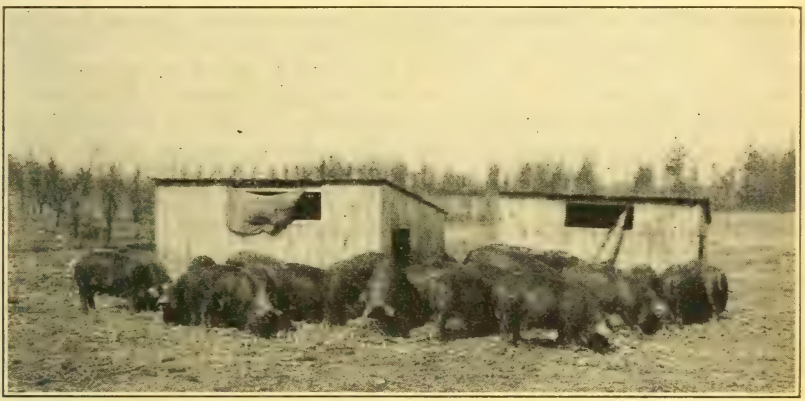

FIG. 11.—Hog equipment does not have to be elaborate. Light houses that can be moved from one pasture to another after they have served as farrowing pens make very serviceable equipment

close relationship to the size of the fall litters. The number of spring pigs and fall pigs per litter are given in Table 18 by farms that had different equipment expense. There did not seem to be much regularity in the percentage of total annual pork that was produced by the two-litter system between the groups having different equipment charges per sow in the two years. In 1921 the farms that had the lowest equipment charge per sow produced no fall litters, in 1922 those farms having the least equipment per sow produced as large a share of their pork from fall pigs as farms having more costly equipment.

Large litters are obtained by using good breeding animals, by feeding them properly, and by painstaking attention to the sow and her litter. The farms having the higher equipment charges produced the larger litters, and the sows on these farms had more labor put on them. This table is presented to show that there is no object in having unnecessarily elaborate equipment, but that in the last analysis there are other things that affect success in hog production far more than the cost of equipment. (Fig. 11.)

TABLE 18.—*Relation of the equipment charge per sow to the number of pigs weaned and the costs in producing pork*

Equipment charge per sow	Number of farms	Number of sows per farm	Number of pigs weaned per sow bred		Percentage of pork produced by two-litter system	Hours of man labor per sow per season	Cost of feed per sow per season	Equipment charge per 100 pounds of pork, spring and fall	Cost of producing 100 pounds of marketable pork, spring and fall	Profit per sow per season
			Spring	Fall						
1921										
Under $4	13	25	4.2	-----	0	7.4	$11.86	$0.39	$5.63	$17.51
$4 to $6	16	21	4.7	4.1	44	7.2	10.71	.39	5.14	30.06
$6 and over	15	12	5.8	4.7	60	11.7	11.76	.64	5.67	22.11
1922										
Under $4	13	29	3.9	4.9	69	6.2	7.82	.27	5.47	13.59
$4 to $6	16	20	3.9	4.9	62	6.7	11.51	.39	6.14	10.93
$6 and over	10	13	4.7	4.7	50	10.0	10.46	.59	6.16	9.78

The average cost for depreciation, upkeep, and taxes on equipment per 100 pounds of marketable pork was 21 cents in 1921 and 17 cents in 1922. As an average, the greater cost of more expensive equipment may be balanced by savings in labor and eliminating unpleasant conditions as a result of more convenient equipment. The necessity of making full use of equipment is emphasized by the wide variations in cost of equipment per 100 pounds in those groups which contain only individual farms. The production program of a hog raiser should be studied in its relation to the cost of equipment before large amounts of farm savings are spent in buildings and equipment.

The pasture charge is the fourth largest item in the cost of growing pork, as determined from this study. Local rates of annual cash rent were used for the different kinds of pasture. The total cost of the pasture was divided between the various classes of livestock using it as equitably as possible.

The miscellaneous costs are the charges for veterinary, death risk, overhead, taxes, and other incidental expense. Table 2 (p. 8) shows the relative importance of these items in relation to total cost. As a group, these costs varied from 10.6 cents to $3.52 per 100 pounds of pork in 1921 and from 15.3 cents to $1.24 per 100 pounds in 1922. The extreme high costs of this group are invariably due to charges for death risk, resulting from losses in the breeding herd. Veterinary costs include expense for professional veterinary services, serum and virus for vaccination, capsules and other vermifuges, medicine, disinfectant, and tonic. Salt and minerals are included in the feed cost and not in the veterinary costs. The farm labor required to administer these services is included in the labor charge. The relative importance of the different items included in the veterinary charge is shown in Table 19. In 1921 the veterinary charge averaged 26 cents and varied from no charge to 88 cents per 100 pounds gain. In 1922 the variations ran from no charge to 54 cents per 100 pounds gain, with an average of 16 cents.

The charge for death risk in this study is determined by the initial value of any animals in the breeding herd which died during the year. Table 20 gives a summary of the causes of the deaths, together with the average weight and value before loss. In 1921 the number of animals in the breeding herd that died during the year was 4.8 per

cent of the total number, and their cost or estimated value was 5.1 per cent of the value of all the breeding herds combined. In 1922 the loss was much smaller as only 2.8 per cent died and had a value of 2.9 per cent of the combined value of all the breeding herds.

The losses in the breeding herd are generally due to two fundamental causes: (1) Failure to protect the herd against epidemic diseases by vaccination or sanitation, and (2) miscellaneous errors in care and management. These losses do not appear excessive as a whole, but the hog business on some of the farms was almost a complete failure as a result of these losses.

TABLE 19.—*Relative importance of various items included in the veterinary charge*

Item	Percentage of total veterinary cost	
	1921	1922
Vaccination	84.8	85.3
Vermifuges	6.7	6.1
Veterinary services	2.1	4.4
Disinfectants	4.1	3.2
Medicine	2.3	1.0
Total	100.0	100.0

TABLE 20.—*Causes of losses in the breeding herd* [1]

Cause of loss	1921	1922	Cause of loss	1921	1922
	Sows	Sows		Sows	Sows
Sows in opening inventory	865	862	Poisoned	3	
Heat	6	5	Necrobacillosis	10	
Farrowing	3	4	Overfeed of mineral	1	
Cholera	8		Lightning	1	
Broken down	1	1	Unknown	6	4
Constipation	2		Missing		1
Influenza	1	4			
Bloat		1	Total	42	24
Crippled		2	Percentage lost	4.8	2.8
Sick		1	Average weight, pounds	294	314
Suckled too thin		1	Average value before loss	$23.55	$24.30

[1] In 1921 four boars were lost: One died from necrobacillosis, one was stolen, and the causes for the deaths of two were not known. No boars were lost in 1922. The average weight of the boars lost in 1921 was 391 pounds and their value before loss $48.75. There were 56 boars inventoried in 1921 and 47 boars inventoried in 1922.

In every business there are items of expense which are incurred for the good of several products or the business as a whole, and can not be charged to any one particular product. These items of expense are generally grouped together as overhead expense and distributed to the various products on some basis. The basis of charging overhead in this study is 3 per cent of all the costs excluding interest. The examination of overhead and hog-expense accounts in several States seemed to indicate that 3 per cent was about the relation of these overhead expense items to the operating cost of the hog enterprise. Typical items found in these overhead expense accounts are farm and breeding association dues, labor of cutting weeds on fence rows and dragging roads, interest and taxes on farmstead and any waste land, telephone, nails, and farm papers.

The taxes and incidental charges include taxes on the breeding herd and pigs, if the pigs were assessed, small charges for kerosene for water heaters, and similar expenses directly chargeable to hogs. The charge for taxes varied from 1 cent to 10 cents per 100 pounds of pork in 1921, and from 0.25 cent to 3.6 cents in 1922. The taxation rate in different districts, and variations in the quantity of pork produced from the breeding herd, cause these variations.

The production of pork on the farm results in several by-products. The by-products are manure, breeding services, and appreciation in value of the breeding herd itself. These by-products may be valued and regarded as a deduction, if a net cost of pork is desired.

Hogs produce large quantities of valuable fertility. The conservation of this fertility depends upon a system of management involving not only the use of rotation pastures for hogs and hogging down corn, but the feeding of hogs on these pastures to prevent the dropping of manure in hog lots where it is often wasted. The value of manure has not been deducted in this study because of the twofold difficulty of determining the quantity produced and the value. With the hog running from the sleeping quarters in the dry lot through the permanent pasture to the clover and the cornfield, the amount produced was an uncertain quantity. Large quantities of this fertility were leached by the rains and of no use in crop production. Manure dropped while hogging down corn or grazing on rotation pasture is presumably saved. Since the sleeping quarters of many hogs are not in the clover or cornfield, it would be necessary to estimate the portion of the manure dropped in the fields. Hog manure hauled from the hog houses is usually of poor quality, as it is largely dust, and the cleanings from the lot are badly leached.

The breeding services of the boar were sold in some cases. In such cases the amount is credited and included in the deductions to secure the net cost.

The increase in value or appreciation of a breeding herd may be a combination of really greater breeding capacity or value and a favorable market fluctuation. In general, pork producers, with purebred hog producers excepted, make little effort to develop and use the full breeding capacity of their herds. The usually favorable market for packer sows makes two or three litters the average life of a brood sow and many are sold after their first litter. Some producers prize the increase in market value of young gilts sufficiently that little effort is made to raise a large litter. The desired pig crop is obtained by breeding a large number of gilts and weaning small litters instead of a smaller number of gilts and weaning larger litters.

The average appreciation in value for both the one and two litter systems of production was 82 cents per sow in 1921 and $5.34 in 1922. Based on the quantity of pork produced it equaled 7 cents per 100 pounds in 1921 and 46 cents in 1922. This appreciation is the difference between the inventory or purchase value at the time of breeding for spring litters and their sale or inventory value before or at the time of breeding for spring litters the following year. If the producer raises his own breeding stock, the increase in value will be somewhat greater than the appreciation here indicated, as farm-grown gilts were placed in the breeding herd at somewhat above butcher prices. If breeding stock is purchased at high values, the depreciation to be sustained may exceed the profit on the pigs.

The average weight of the tried sows at breeding time was 310 pounds in 1921 and 312 pounds in 1922. The tried sows which were fattened and sold gained 99 pounds in 1921 and the same figure in 1922. A more favorable market in 1922 made the average increase in value of old sows $2.31 per head; in 1921 there was a decrease in value of the tried sows of $6.58.

Higher inventory values at the beginning of 1921 also influenced the amount of appreciation in that year. Young gilts weighing about 200 pounds when bred increased in weight 125 pounds and in value $3.70 per head in 1921, and in 1922 they increased 164 pounds in weight and $9.61 in value. The greater increase in value in 1922 was influenced by a greater gain and a more favorable market. The increase in value would have been greater if gilts or breeding stock had been valued on a butcher basis.

FINANCIAL RETURNS FROM THE HOG ENTERPRISE

The relation of the cost of production to profit is presented in Table 21. A very definite decrease in profit per 100 pounds gain and return per bushel of corn accompanies each increase in cost. In determining the amount returned for the corn, all feed, except corn, and all other items of expense were deducted and the remainder was divided by the number of bushels of corn fed. The average profit per 100 pounds was $2.39 in 1921 and $1.35 in 1922. The hogs returned 69 cents per bushel for corn in 1921 and 71 cents in 1922, besides paying market price for other feeds grown and purchased for labor, equipment, interest, and all other various costs. The average value of the corn consumed was 36 cents in 1921 and 52 cents in 1922. The margin of the return by hogs over the farm value of the corn was 33 cents per bushel in 1921 and 19 cents in 1922.

TABLE 21.—*The effect of cost of production upon profit*

Range in cost per 100 pounds of pork	1921			1922		
	100 pounds		Return per bushel of corn fed	100 pounds		Return per bushel of corn fed
	Average cost	Profit or loss [1]		Average cost	Profit or loss [1]	
$3.00 to $4.00	$3.32	$3.02	$1.01			
$4.00 to $5.00	4.66	3.24	.86	$4.88	$2.96	$0.97
$5.00 to $6.00	5.28	2.71	.73	5.47	2.07	.83
$6.00 to $7.00	6.51	1.23	.52	6.37	1.55	.74
$7.00 to $8.00	7.42	.87	.48	7.44	−.23	.50
$8.00 to $9.00	8.07	−.27	.32	8.24	−1.06	.42
$9.00 to $10.00				9.20	−1.79	.34
$10.00 to $11.00	10.89	−3.98	.11	10.02	−2.04	.27
$11.00 to $12.00	11.09	−3.55	.08			
$12.00 to $13.00						
$13.00 to $14.00	13.55	−5.27	−.09			
Average	5.49	2.39	.69	6.32	1.35	.71

[1] Figures preceded by a minus sign (−) were losses.

RELATIONSHIP OF CORN AND HOGS

Corn and hogs are so closely related in American farming that they have developed a rather definite cycle of production and price. A graphic summary of the data secured in this two-year study of

costs and methods of pork production is presented in Table 22. In this table the cost of production has been converted into corn equivalents. The average number of bushels of corn fed to the hogs was 7.2 bushels in both 1921 and 1922. This does not include the other miscellaneous feeds which were fed. The average price of this corn was 36 cents in 1921 and 52 cents in 1922. The average cost for feed per 100 pounds of pork was $3.51 in 1921 and $4.72 in 1922.

On the basis of average prices of corn for 1921 and 1922, the total feed cost per 100 pounds of pork in 1921 was equivalent to the price of 9.8 bushels of corn, and in 1922 the feed cost was equivalent to the price of 9.1 bushels of corn. The difference between the number of bushels of corn fed to the hogs and the corn equivalent of the total feed cost per 100 pounds is the number of bushels of corn at the average price for that year to pay for the miscellaneous feeds, either farm-grown or purchased, which were fed to the hogs during that year. The value of these feeds other than corn was only 92 cents per 100 pounds of pork in 1921 and 98 cents in 1922. The extremely low price of corn in 1921 made 2.6 bushels of corn necessary to pay for 92 cents worth of other feed; in 1922, 1.9 bushels of corn would buy 98 cents worth of other feed.

TABLE 22.—*Bushels of corn necessary to pay the costs of the production of pork*

Item	1921		1922	
	Value	Equivalent in corn	Value	Equivalent in corn
	Dollars	*Bushels*	*Dollars*	*Bushels*
Feed cost	3.51	9.8	4.72	9.1
Corn cost	2.59	7.2	3.74	7.2
Other feed	.92	2.6	.98	1.9
Other costs	1.98	5.4	1.60	3.1
Gross cost	5.49	15.2	6.32	12.2
Profit	2.39	6.6	1.35	2.6
Sale price	7.88	21.8	7.67	14.8
Average price of corn	.36		.52	

The average gross cost of producing 100 pounds of pork on the farm was $5.49 in 1921 and $6.32 in 1922. If these average costs of growing 100 pounds of pork are converted into corn equivalents with the average price of corn for each year as a base, the corn equivalent of the gross cost of growing 100 pounds of pork in 1921 was 15.2 bushels and in 1922, 12.2 bushels. Three bushels less corn were required in 1922 to pay for all the items of cost of production than in 1921. In 1921, 5.4 bushels of corn at the average price for that year were required to pay for the costs other than feed; in 1922 the value of 3.1 bushels of corn was necessary to cover the cost of these items.

The double effect of increasing corn prices and decreasing hog prices during 1922 upon hog profits is also shown in Table 22. The corn equivalent of the average sale price of 100 pounds of pork in 1921 was 21.8 bushels of which 6.6 bushels was profit. In 1922 the corn equivalent of the average sale price was 14.8 bushels of which 2.6 bushels was profit.

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